

**IN THE CLAIMS**

The following is a complete listing of the claims, which replaces all previous versions and listings of the claims.

1. (currently amended) A method of triggering an imaging system, comprising:  
  
sensing physiological activity via a sensor configured to directly detect physical motion of internal tissue of a subject;  
  
isolating an event in the physiological activity;  
  
predicting a future occurrence of the event for triggering an imaging system, wherein predicting the future occurrence of the event comprises:  
  
analyzing historical behavior of the physiological activity; and  
  
calculating an expected time interval between successive occurrences of the event;  
  
calculating a prediction error between a predicted time and an actual time of the future occurrence; and  
  
adjusting the predicted time based on the prediction error, wherein adjusting the predicted time comprises adjusting in real-time ~~a~~ the predicted time interval based on the prediction error.
2. (original) The method of claim 1, wherein sensing physiological activity comprises mechanically sensing internal physiological activity.
3. (original) The method of claim 1, wherein sensing physiological activity comprises non-intrusively sensing internal physiological activity.

4. (original) The method of claim 1, wherein sensing physiological activity comprises sensing motion of an internal organ of a subject.

5. (original) The method of claim 1, wherein sensing physiological activity comprises sensing a plurality of physiological parameters.

6. (original) The method of claim 1, wherein sensing physiological activity comprises sensing internal mechanical activity of a subject.

7. (original) The method of claim 6, wherein sensing internal mechanical activity comprises sensing cardiovascular activity of the subject.

8. (original) The method of claim 7, wherein sensing cardiovascular activity comprises sensing cardiac activity.

9. (original) The method of claim 6, wherein sensing internal mechanical activity comprises sensing respiratory activity of the subject.

10. (original) The method of claim 9, wherein sensing respiratory activity comprises sensing lung activity.

11. (original) The method of claim 1, wherein isolating the event comprises analyzing the physiological activity over a time interval.

12. (original) The method of claim 1, wherein isolating the event comprises isolating a desired activity from the physiological activity.

13. (original) The method of claim 12, wherein isolating the event comprises identifying cyclical patterns in the physiological activity.

14. (original) The method of claim 12, wherein isolating the event comprises separating the desired activity based on known motion characteristics of the desired activity.

15. (original) The method of claim 13, wherein isolating the event comprises filtering at least a portion of the cyclical patterns having frequencies outside of an expected frequency range for the desired activity.

16. (original) The method of claim 12, wherein isolating the event comprises identifying a desired phase in a cycle of the desired activity.

17. (original) The method of claim 16, wherein identifying the desired phase comprises identifying a peak amplitude in the cycle.

18. (original) The method of claim 1, wherein isolating the event comprises isolating a repeating point in a cyclical signal corresponding to an internal organ of a subject.

19. (original) The method of claim 18, wherein isolating the event comprises isolating a cardiovascular event of the subject.

20. (original) The method of claim 18, wherein isolating the event comprises isolating a respiratory event of the subject.

21. (canceled)

22. (canceled)

23. (previously presented) The method of claim 1, wherein predicting the future occurrence comprises determining a reference time based on a previous occurrence of the event and adding the expected time interval to provide a predicted time for the future event.

24. (original) The method of claim 1, wherein predicting the future occurrence comprises adjusting a predicted time to account for system response delays in the imaging system.

25. (original) The method of claim 1, comprising controlling timing of an image acquisition component of the imaging system.

26. (original) The method of claim 1, comprising acquiring a desired image of the event.

27. (previously presented) The method of claim 26, wherein acquiring the desired image of the event comprises obtaining image data of a cardiac phase.

28-91. (canceled)

92. (previously presented) A method of triggering an imaging system, comprising:

sensing cardiovascular activity via a sensor configured to detect physical motion of cardiovascular tissue of a subject;

isolating an event in the cardiovascular activity;

predicting a future occurrence of the event for triggering an imaging system;

calculating a prediction error between a predicted time and an actual time of the future occurrence; and

adjusting the predicted time based on the prediction error, wherein adjusting the predicted time comprises adjusting in real-time a predicted time interval between successive occurrences of the event based on the prediction error.

93. (previously presented) The method of claim 92, wherein sensing cardiovascular activity comprises non-intrusively sensing cardiovascular activity.

94. (previously presented) The method of claim 92, wherein sensing cardiovascular activity comprises sensing cardiac activity.

95. (previously presented) The method of claim 92, wherein isolating the event comprises analyzing the cardiovascular activity over a time interval.

96. (previously presented) The method of claim 92, wherein isolating the event comprises isolating a desired activity from the cardiovascular activity.

97. (previously presented) The method of claim 96, wherein isolating the event comprises identifying cyclical patterns in the cardiovascular activity.

98. (previously presented) The method of claim 97, wherein isolating the event comprises filtering at least a portion of the cyclical patterns having frequencies outside of an expected frequency range for the desired activity.

99. (previously presented) The method of claim 96, wherein isolating the event comprises separating the desired activity based on known motion characteristics of the desired activity.

100. (previously presented) The method of claim 96, wherein isolating the event comprises identifying a desired phase in a cycle of the desired activity.

101. (previously presented) The method of claim 100, wherein identifying the desired phase comprises identifying a peak amplitude in the cycle.

102. (previously presented) The method of claim 92, wherein isolating the event comprises isolating a repeating point in a cyclical signal corresponding to the heart of a subject.

103. (previously presented) The method of claim 92, wherein predicting the future occurrence comprises analyzing historical behavior of the cardiovascular activity.

104. (previously presented) The method of claim 103, wherein analyzing historical behavior comprises calculating an expected time interval between successive occurrences of the event.

105. (previously presented) The method of claim 104, wherein predicting the future occurrence comprises determining a reference time based on a previous occurrence of the event and adding the expected time interval to provide a predicted time for the future event.

106. (previously presented) The method of claim 92, wherein predicting the future occurrence comprises adjusting a predicted time to account for system response delays in the imaging system.

107. (previously presented) The method of claim 92, comprising controlling timing of an image acquisition component of the imaging system.

108. (previously presented) The method of claim 92, comprising acquiring a desired image of the event.

109. (previously presented) The method of claim 108, wherein acquiring the desired image of the event comprises obtaining image data of a cardiac phase.

110-112. (canceled)

113. (currently amended)     A method of triggering an imaging system,  
comprising:

detecting a surface motion of a subject, the motion indicative of a physiological activity of the subject;

isolating an event in the physiological activity; ~~and~~

predicting a future occurrence of the event for triggering an imaging system;

calculating a prediction error between a predicted time and an actual time of the future occurrence; and

adjusting the predicted time based on the prediction error, wherein adjusting the predicted time comprises adjusting in real-time a predicted time interval between successive occurrences of the event based on the prediction error.

114. (previously presented)     The method of claim 113, wherein the surface motion is detected by a sensor in contact with the subject.

115. (previously presented)     The method of claim 113, wherein the surface motion is detected by a sensor that is not in contact with the subject.

116. (previously presented)     The method of claim 115, wherein the sensor is positioned in contact with a subject support table.



117. (previously presented) The method of claim 113, wherein detecting the surface motion comprises non-intrusively detecting the surface motion.

118. (previously presented) The method of claim 113, wherein the physiological activity comprises cardiovascular activity of the subject.

119. (previously presented) The method of claim 118, wherein the cardiovascular activity comprises cardiac activity.

120. (previously presented) The method of claim 113, wherein the physiological activity comprises respiratory activity of the subject.

121. (previously presented) The method of claim 120, wherein the respiratory activity comprises lung activity.

122. (previously presented) The method of claim 113, wherein isolating the event comprises analyzing the surface motion over a time interval.

123. (previously presented) The method of claim 113, wherein isolating the event comprises isolating a desired activity from the physiological activity.

124. (previously presented) The method of claim 123, wherein isolating the event comprises identifying cyclical patterns in the physiological activity from the surface motion.

125. (previously presented) The method of claim 123, wherein isolating the event comprises separating the desired activity based on known motion characteristics of the desired activity.

126. (previously presented) The method of claim 123, wherein isolating the event comprises identifying a desired phase in a cycle of the desired activity.

127. (previously presented) The method of claim 126, wherein identifying the desired phase comprises identifying a peak amplitude in the cycle.

128. (previously presented) The method of claim 113, wherein isolating the event comprises isolating a repeating point in a cyclical signal corresponding to an internal organ of a subject.

129. (previously presented) The method of claim 128, wherein isolating the event comprises isolating a cardiovascular event of the subject.

130. (previously presented) The method of claim 128, wherein isolating the event comprises isolating a respiratory event of the subject.

131. (previously presented) The method of claim 113, wherein predicting the future occurrence comprises analyzing historical behavior of the surface motion.

132. (previously presented) The method of claim 131, wherein analyzing historical behavior comprises calculating an expected time interval between successive occurrences of the event.

133. (previously presented) The method of claim 132, wherein predicting the future occurrence comprises determining a reference time based on a previous occurrence of the event and adding the expected time interval to provide a predicted time for the future event.

134. (previously presented) The method of claim 113, wherein predicting the future occurrence comprises adjusting a predicted time to account for system response delays in the imaging system.

135. (previously presented) The method of claim 113, comprising controlling timing of an image acquisition component of the imaging system.

136. (previously presented) The method of claim 113, comprising acquiring a desired image of the event.

137. (previously presented) The method of claim 136, wherein acquiring the desired image of the event comprises obtaining image data of a cardiac phase.

138-140. (canceled)